DOCUMENT RESUME

ED 088 221 EA 005 955

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TITLE The Resource Approach to Program Cost Analysis.
PUB DATE Feb 74
NOTE 34p.; Paper presented at American Educational Research Association Annual Meeting (59th, Chicago, Illinois, April 15-19, 1974)

EDRS PRICE MF-$0.75 HC-$1.85
DESCRIPTORS *Cost Effectiveness; Educational Economics; Educational Finance; *Educational Planning; Expenditure Per Student; Models; *Program Budgeting; *Program Costs; Program Planning; *Resource Allocations

ABSTRACT

This paper develops the techniques for allocating the quantity of a school's resources to particular programs and classrooms within the school, considering the sharing of resources. The methodology presented determines the cost of an educational program by identifying the resources utilized in a program. All costs are taken into consideration and are placed within the framework of staff, equipment, materials, facilities, and services. The paper suggests that this methodology is much stronger than the more traditional budgetary and cost/pupil approach. (Author)

ED 088221

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THE RESOURCE APPROACH TO PROGRAM COST ANALYSIS

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February 1974

RMC RESEARCH CORPORATION

This paper is derived from the research performed under contract to the Educational Testing Service as part of a study for the United States Office of Education, Office of Planning, Budgeting, and Evaluation. The results presented here reflect the views of the authors, but not necessarily those of ETS or USOE.

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ABSTRACT

THE RESOURCE APPROACH TO PROGRAM COST ANALYSIS

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The methodology of costing an educational program by identifying the resources it utilizes is presented. All costs are taken into consideration and are placed within the framework of staff, equipment, materials, facilities, and services. This paper suggests that this methodology is much stronger than the more traditional budgetary and cost/pupil approach. The paper develops the techniques for allocating the quantity of a school's resources to particular programs and classrooms within the school, considering the sharing of resources.

RESOURCE APPROACH TO PROGRAM COST ANALYSIS

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With growing importance being given to evaluating the cost-effectiveness of educational programs, it is becoming more critical to develop accurate estimates of the true cost of a program. The use of budgetary per pupil accounting costs for estimating program expenses is woefully inadequate for an effective analysis. For the most part, school districts' budgets do not separate costs for individual classrooms within a school. To use district-wide budget costs as an estimate of cost implies that resources are used uniformly throughout a school or district. Unfortunately, this implicit assumption is usually not correct. Education programs quite often concentrate school resources in an effort to assist a small target population. Average program costs based on budget data tend to obscure the true cost of these concentrated resources. In addition, the use of budgetary cost data neglects the value of resources inherited from past years expenditures. Budget costs can also distort the evaluation of program costs by including one-time capital expenses in the estimates.

A more appropriate technique for estimating the cost of individual programs is by determining the actual quantity of all resources (i.e., staff, equipment, materials, and facilities) used in a program, and then estimating the cost of these resources. We refer to this technique as the resource approach to program cost analysis. Because the procedure enumerates the resources for each program separately, it allows for a more precise examination of the impact on cost of differential uses and mix of resources. In addition, because it considers all resources independent of when they were acquired, it allows the examination of inherited resources.

Several previous studies have examined the resource approach to cost analysis, particularly by Haggart.[1] However, the approach presented in most

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1. Sue A. Haggart, "Program Cost Analysis in Education Planning." RAND Corporation, Paper P-4744 (December 1971).

previous studies assumes that the identified resources are used exclusively by a particular program. In actual practice, exclusive use is rare. Generally, resources are shared by a variety of programs. For example, classroom teachers generally provide instruction in more than one subject area, and equipment is shared by all teachers in a school. While the techniques presented in previous studies can be modified to consider this sharing of resources, no systematic procedures to do this were developed. It is the purpose of this paper to re-examine the resource approach to program cost analysis and to develop a model to estimate the cost of educational programs considering the use of shared resources.

The cost model developed in this paper was designed to complement and support a large-scale evaluation of compensatory reading programs being conducted by the Educational Testing Service (ETS) for the U.S. Office of Education. The most significant phase of this evaluation involves the examination of reading programs in approximately 260 schools around the nation. Of this total, approximately 100 schools had compensatory reading programs funded by Title I, 100 had compensatory reading programs funded from sources other than Title I, and 30 had no identified compensatory reading programs. The remaining schools, approximately 30, were included becuase they were considered exemplary programs. In each school, all the students in the second, fourth, and sixth grades were given special pre- and post-tests to determine reading achievement and changes in student attitudes during the school year. For these students, detailed attendance records were kept of their participation in particular reading classes. In addition, the principal and all teachers of students in the affected grades completed questionnaires where they described the demographic characteristics of the students and discussed their techniques and approaches to teaching. Finally, the principal completed a questionnaire where he identified and enumerated all the resources employed in his school.

Because the collection of these data has just recently been completed, no results are presently available. When they become available later, both the program costs and observed program outcomes will be integrated into a cost effectiveness evaluation to determine the relative merits of alternative compensatory reading programs. Although final results cannot be reported in this paper, it is felt that the approach taken in the analysis of reading

program costs was unique and offered a consistent framework for analysis that could be adopted in other program evaluations.

PRINCIPLES OF COST

Before discussing the basic model, a number of technical and conceptual issues must be confronted regarding cost. These issues include the use of total vs incremental costs, the identification of both capital and annual operating cost, and the use of actual vs standard costs. A brief discussion of these issues is provided below.

Total vs Incremental Cost

Costs of individual reading programs can be investigated in two distinct ways. The first is referred to as total program costs. Included in this definition are the total expenditures, both past and present, for all resources used in a program. Both capital and annual operating expenses are included. Total program costs also include the cost of resources available within a district or assets inherited from discontinued programs which can be used in the reading program. Sue Haggart of the RAND Corporation refers to this cost as the comparable replication cost.[2] Total program cost is the most appropriate format for comparing alternative program costs, and is the format used in this report.

Incremental program costs, on the other hand, measure only the additional costs required by a district to implement a reading program. Costs for inherited assets or donated resources are disregarded and treated as free goods. Economists refer to these as "sunk" costs. Incremental cost is best used in deciding whether or not a particular program should be implemented in a specific district. It is not appropriate for making comparisons of alternative reading programs.

Capital and Annual Operating Cost

For all elements of the reading program, costs are separated into two categories: capital investment and annual operating expenses. Capital costs are one-time expenditures needed for the initial implementation of a reading

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2. Op. cit.

program. These include costs for new facilities, equipment, materials, and initial staff training. If a program is totally new (such as a demonstration project), the capital costs might also include one-time expenditures for program design and development of materials. For this study, however, we have disregarded program development costs. Rather, we have estimated the costs of fully operational programs.

Annual operating expenses are the costs needed each year to operate and maintain a reading program according to its initial design. They include the expenses for salaries, in-service training, materials and supplies, equipment maintenance, facilities operations and maintenance, and other services related to the reading program. These two broad categories of cost--capital investment and annual operations--are used as the basis for organizing the cost elements of school and class level reading programs.

The primary distinction between the two categories is the length of time benefits are derived from each type of expenditure. Capital resources last many years, while annual expenditures (by definition) are consumed in less than one year. To facilitate making cost-effectiveness comparisons of alternative reading programs, we need to combine the two costs into a single value.

The best procedure for making the two costs comparable is to convert the capital investment costs into a series of uniform annual expenditures. Capital costs are "amortized" over their useful life using the following formula:

$$\text{Equivalent Annual Cost} = \text{Capital Cost} \times \text{Capital Recovery Factor (CRF)}$$

where $CRF = i(1+i)^n/(1+i)^n-1$

n = useful life
i = discount rate.

The annualized capital costs computed in this manner can be combined with the other annual operating expenses to give total annualized program costs.

Actual vs Standard Costs

The final issue involves a choice between using the actual cost of a resource at each school, or a "standardized" cost. The actual cost is the cost the school actually paid for a resource. Actual costs require the use

of separate teacher salary schedules for each school district, and specific price levels for individual equipment and facility costs. For the same resource actual costs will vary from school to school depending on local salary levels and economic conditions. Standard costs, on the other hand, are based on national averages and eliminate the local and regional variations in cost.

It is important that local administrators know the actual cost of a program, particularly with regard to the actual incremental cost of the program because this represents the cost to the school district to institute a program. However, actual costs tend to obscure the comparison of alternative school reading programs because of the influence of local variation in the cost. For this reason, only standardized costs should be used to compare alternative programs. This procedure is used in this paper. It should be pointed out, however, that there is no limitation within the model as to the type of cost, either actual or standard, which must be used in the model.

PROGRAM COST MODEL

The resources used in a reading program are defined by category and include staff, facilities, equipment, material, and district centers. For each of the resource items within these categories, the reading program cost model estimates the quantity that is available for reading in each school. Using the unit cost factors for each resource item, it then calculates the total cost of employing the resource for reading. In this study, unit cost is defined to represent the cost of a single unit of the resource, for example, one tape recorder.

The basic procedure used in the model is presented in Figure 1. It consists of four submodels and a series of inputs and outputs. Each of these submodels and their associated inputs and outputs are discussed below.

Program Allocation Submodel

The program allocation submodel is used to estimate the quantity of a resource that is employed for reading in a school. The model utilizes as inputs the total quantity of a resource available in a school and a program factor. This program factor represents the proportion of time that the resource is used by the school in reading, rather than in other subject areas.

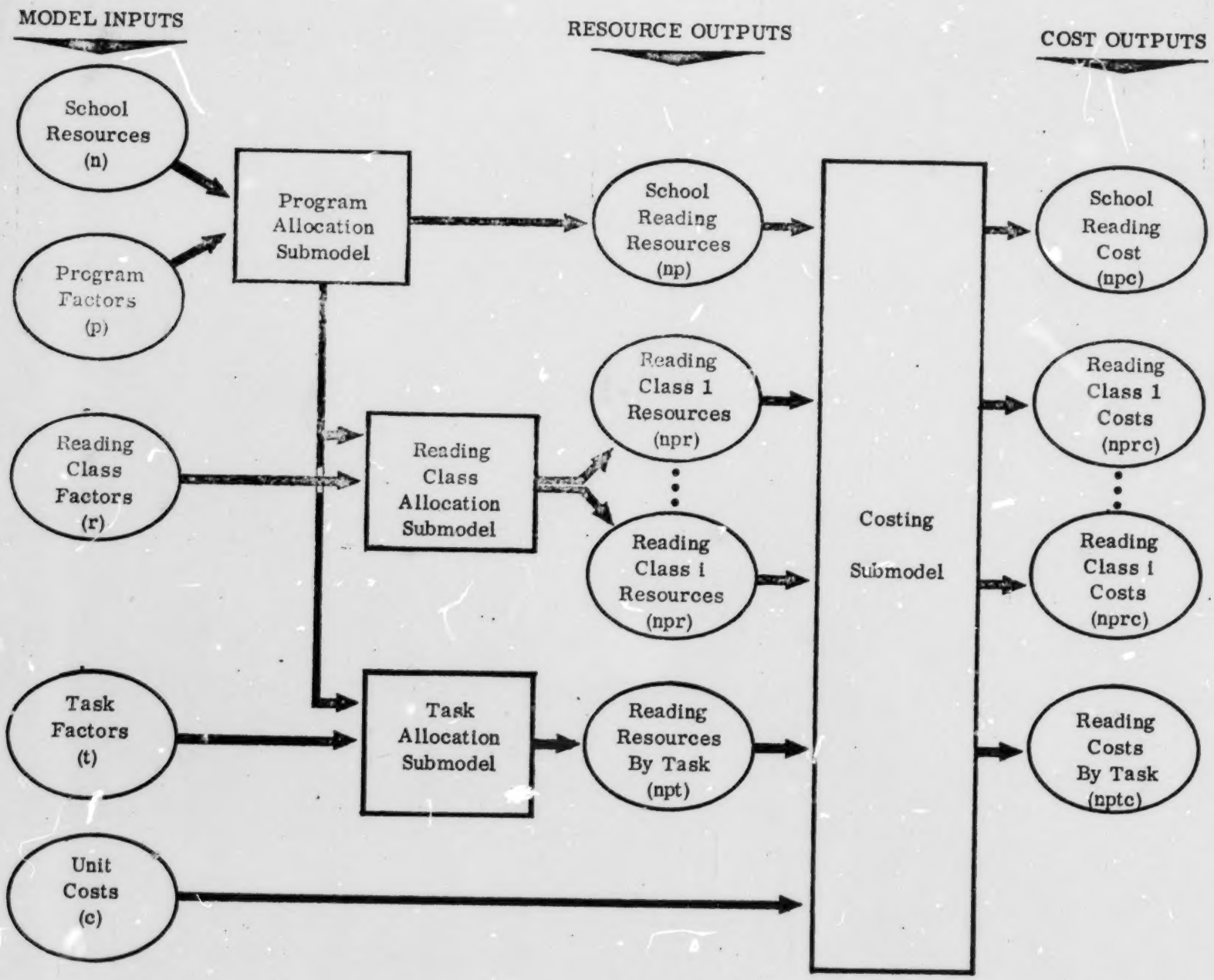

Figure 1: READING PROGRAM COST MODEL

The procedure for calculating program factors varies according to the type of resource being examined. Specific cases are discussed later in detail. The product of these two inputs is an estimate of the quantity of resources available in a school for reading. In equation form, this submodel can be expressed as follows:

$$SRR = np \qquad (1)$$

where SRR = quantity of school reading resources
n = total quantity of a resource available in a school
p = program factor: fraction of time a resource used in reading

In other words, the program allocation submodel divides the resources available in a school into those used in reading and those that are not.

Reading Class Allocation Submodel

For purposes of estimating costs, a reading class is defined as any group of students for which a separate attendance record is kept. Reading classes are generally conventional classrooms, but may also include small groups of students taught by a reading specialist if attendance was taken.

The reading class allocation submodel is used to estimate the quantity of resources actually employed in each reading class. The submodel utilizes as inputs the quantity of school reading resources, determined by the program allocation submodel and a reading class factor. The reading class factor is the proportion of time that a shared resource is used in each reading class. The calculation of this factor varies with different resources and is discussed later in detail. The product of these two inputs is an estimate of the quantity of resources available in each reading class for reading. Mathematically, this submodel can be expressed by the following equation:

$$CRR = npr \qquad (2)$$

where CRR = quantity of class reading resources
r = reading class factor: fraction of time a resource is used in a particular reading class when the resource is being used in reading.

Thus, the reading class allocation submodel divides school reading resources among all classes in the school where reading is taught. Although only the

resources used in the reading classes in the second, fourth, and sixth grades are tabulated by this submodel, all reading classes in the schools are considered in the calculations.

Task Allocation Submodel

The majority of the resources used in a school for reading are used for actual instructional purposes. There are other tasks, however, which are necessary to properly support any reading program. These additional tasks include the diagnosis of student reading problems, in-service training for reading staff, and program planning and administration. The emphasis given by various schools to each of these tasks may prove important in future cost-effectiveness analyses. The task allocation submodel is used to evaluate the relative emphasis given to each task.

The submodel is used to estimate the proportion of each resource employed for the four tasks identified above. It utilizes as inputs the quantity of school reading resources determined by the program allocation submodel and a task factor. The task factor is the fraction of time a resource is used in a particular task when the resource is being used in reading. The calculation of this factor will be described later in greater detail. The product of these two inputs is an estimate of the quantity of resources employed for each task. Mathematically, this submodel can be expressed by the following equation:

$$TRR = npt \qquad (3)$$

where TRR = quantity of school reading resource by task
t = task factor: fraction of time a resource is used for a particular task when the resource is being used in reading

Thus, the task allocation submodel apportions all school reading resources among the various tasks that the school performs.

Costing Submodel

The costing submodel performs the final operation of the reading program cost model. It is used to calculate the capital and annual operating costs associated with the quantity of resources resulting from the other three submodels. In addition, this submodel produces the output reports presented in this paper.

The costing submodel employs unit cost inputs for each resource and calculates the cost of the various school, class, and task resources used in reading programs. As defined previously, a unit cost is the cost for one unit of a resource. Unit costs include the capital cost component (i.e., the non-recurring cost to acquire the resource) and operating cost components (i.e., the annual recurring cost).

The costing submodel operates by multiplying the unit cost for each resource item by the quantity used for the various levels of the analysis. Mathematically, this submodel can be expressed by the following three equations:

$$SRC = npc \quad (4)$$

$$CRC = nprc \quad (5)$$

$$TRC = nptc \quad (6)$$

where SRC = cost of a school reading resource
CRC = cost of a reading class resource
TRC = cost of a school reading resource by task
c = unit cost factor

Model Operation

A total of 94 different kinds of resources were identified. For each of the resource items, the following parameters must be calculated to operate the reading program cost model:

- school quantity (n),
- program factor (p),
- reading class factors (r),
- task factors (t), and
- unit cost (c).

Using these parameters as inputs, the model is operated in successive steps to derive estimates of the quantity and costs of each reading program resource at the various levels of analysis shown on Figure 1. The results of these successive operations are aggregated to form total school, reading class, and task costs.

DATA COLLECTION

The analysis of reading program costs involved data from four primary sources:

1. Resource Questionnaire
2. Site Visit Reports
3. Program data
4. Secondary data sources.

The Resource Questionnaire was mailed to the principals in all schools in the sample. The instrument was designed to collect specific information about the number and type of resource at each school and how each is used in reading instruction. It addresses only those areas related to resource requirements, i.e., number of staff, type of staff, equipment inventory, materials used, etc. It did not solicit any information about costs. A response rate of about 97 percent was obtained from the Resource Questionnaire.

Actual site visits were made to a sample of 100 schools for the purpose of collecting detailed cost and program data relevant to the school reading programs. The cost data collected from these schools were used to derive standard cost factors for computing program costs for all 260 schools. Costs were collected for direct resource items and for all indirect activities and district services that support school reading programs.

Both the Program Characteristics Questionnaire and the Teacher Characteristics Questionnaire sent to all teachers involved in the study were used as the primary data sources for estimating class level costs. Specific data utilized from these questionnaires included information about the amount of time spent in reading, the use of specific equipment, and the teachers' experience and academic degrees. In addition to these questionnaires, student attendance records kept by these teachers were used in identifying the reading specialists in the school.

The final source of cost data was from secondary sources including reports, price catalogues, and national publications. These were particularly useful in preparing the detailed cost estimates for specialized staff personnel, equipment, and reading materials.

CALCULATION OF MODEL PARAMETERS

Using the data collected from the four sources above, the five model parameters can be calculated for each resource. Two of these calculations are relatively straightforward. The school quantity (n) is determined directly from the Resource Questionnaire. The unit cost of a resource (c) is standardized for all schools and set equal to the average value of the observed cost for each resource seen at the 100 site visits. The remaining three parameters are more difficult to explain because they vary with various categories of resources depending on how their use is divided between different subjects and different classrooms. These three factors are discussed below for various types of resources.

Program Factors

As defined previously, the program factor represents the proportion of the cost of a resource that must be allocated to the reading program. The procedure for estimating this factor for the five general types of resources is presented below.

Staff

There are five general categories of staff for which different rules for calculating the program factor have been identified. These include the regular classroom teachers, teacher aides and other professional staff, general administrative personnel, and reading administrative personnel. Each of these is discussed below.

- Regular Classroom Teachers

  Regular classroom teachers teach a variety of subjects during the day. By our definition, the program factor is proportional to the amount of time they spend teaching their students reading. The total amount of time they spend in reading each week can be determined from the Program Characteristics Questionnaire they completed. If this number is divided by the total amount of time they spend in class each week (estimated to be 30 hours), their program factor can be calculated. Mathematically:

$$p = \frac{h}{30} \qquad (7)$$

  where h = hours spent in reading per week as determined from Program Characteristics Questionnaire

- Teacher Aides or Other Professional Staff

In the Resource Questionnaire, the principal was asked to estimate the percentage of time that this type of staff spent in non-reading activities. By subtracting this percentage from one, an estimate can be made of the time spent in reading, which is used as the program factor. Mathematically, this relationship can be expressed by the following equation:

$$p = 1-k \tag{8}$$

where k = fraction of time a staff member spends in non-reading activities

- General Administrative Personnel

Certain staff in the school provide support to the general operation of the school, although not directly to the reading program. These staff include the principal and the secretaries. It is assumed that the program factor for these staff is equal to the average value of the program factor for all classroom teachers. This is based on the fact that these staff, while not necessarily involved in the reading program, are required to operate the school and do support the teachers. It is reasonable to assume that their indirect support of the reading program is proportional to the amount of time the average teacher spends in reading. This program factor is calculated by the following equation:

$$p = \frac{\Sigma p_i}{N} \tag{9}$$

where p_i = the program factor for the i^{th} classroom teacher
N = total number of classroom teachers in analysis

- Reading Administrative Personnel

Certain administrative staff are fully dedicated to the reading program. These staff, usually found at the district level, include the reading supervisor and special teaching consultants. Thus,

$$p = 1.00 \tag{10}$$

Facilities

The classroom is used as the basic resource unit in the facilities cost model. It is reasonable to assume that the use of facilities for reading purposes is proportional to the amount of time the class instructor teaches reading. Thus, knowing the type of class instructor, either a regular classroom teacher or a reading specialist, the program factor can be calculated by either Equation 7 or 8.

Equipment

For each type of equipment available in the school, the principal was asked to indicate how often it was used for reading instruction as opposed to other subject areas. These responses were used to estimate the program factors for equipment.

Materials

Four types of materials are investigated in the reading program cost model. They include: basal readers, individual reading kits, library books, and other supplies. The program factor for basal readers, individual reading kits, and library books, because they are used almost exclusively for reading, is assumed to be equal to one. Because the other supplies include the expenditures for all subjects, this same assumption cannot be made. However, it is reasonable to assume that the allocation of such supplies to reading programs would be proportional to the amount of time spent in reading. Thus, the average teacher program factor (see Equation 9) is used to estimate the quantity of other supplies used for reading programs.

District Centers

There are two kinds of district centers: those which specialize in dealing with students themselves and those that act as resources to schools. The first type generally provides a variety of instructional or diagnostic services to which the schools can send students. The second type does not deal directly with students, but acts as a resource to the schools by providing additional equipment and materials, giving staff training sessions, developing curriculum, etc. For costing purposes, these types are called Student Related Centers and Resource Related Centers, respectively. Because of the relatively small number of these centers and the significant variation in their character between schools, it was decided that the cost of these centers to a school to support their reading program would be calculated outside the reading program cost model. Because the cost thus calculated does not include the non-reading functions of these centers, the program factor is defined as one.

Reading Class Factor

As previously defined, the reading class factor represents the proportion of the cost of a reading related resource that must be allocated to a particular classroom. The procedure for estimating this factor for the five general types of resources is presented below.

Staff

There are four general categories of staff for which different rules for calculating the reading class factor have been identified. These include the regular classroom teachers, a reading specialist who identified her students, support staff whose assistance to individual teachers was discussed in the Program Characteristics Questionnaire, and other staff. Each of these is discussed below.

- Regular Classroom Teachers

  Classroom teachers only teach reading to one class. Thus, because their time when they are teaching reading is fully dedicated to one class, their reading class factor is equal to one, or:

$$r = 1.0 \qquad (11)$$

- Reading Specialists

  When a reading specialist identified the students she taught by keeping study attendance records, a reading class similar to that of a regular classroom teacher was formed. It is possible to allocate the cost of this reading specialist directly to this class. In the event she does not keep such attendance records, this identification is not possible, and her cost must be allocated using different rules discussed in later sections.

  Because of the large number of students a reading specialist works with, and the likelihood of teaching students in more than one grade, a reading specialist who does keep study attendance records generally is associated with more than one reading class record. It is assumed in this model that the fraction of time she spends with each class is in proportion to the number of students in that class divided by the total number of students being taught. Since the specialist teaches only reading, this same proportion is equal to the reading class factor. From the attendance records, it is possible to determine the number of students that are taught in the second, fourth, and sixth grades. Unfortunately, attendance was not taken for students in the first, third, and fifth grades. Thus, the number of students an instructor teaches in these grades is not known, nor is the number of students she teaches known. However, an estimate can be made of the total number of students taught by determining the average number of students taught per

grade for the grades where attendance is taken. This average, multiplied by the number of grades in which the instructor is known to teach (available in the Resource Questionnaire) forms an estimate of the total number of students taught. Expressed in equation form, this becomes

$$s_t = \frac{\hat{s}}{e} \cdot f \qquad (12)$$

where s_t = total number of students taught by an instructor
$\hat{s}$ = total number of students known to be taught by this instructor in Grades 2, 4, and 6
e = number of Grades taught by instructor in grades 2, 4, and 6
f = total number of grades taught by instructor

This calculation is best demonstrated with an example. Suppose a particular reading specialist teaches 10 students in the second grade and 14 students in fourth grade ($\hat{s} = 10 + 14 = 24$). Considering only Grades 2, 4, and 6, she teaches two grades (Grades 2 and 4, or $e = 2$). If, from the Resource Questionnaire, she is known to actually teach Grades 2, 3, and 4 ($f = 3$), an estimate of the total number of students she teaches is $(24/2) \cdot 3 = 36$. Using this result, the reading class factor for a particular class taught by this instructor can be calculated by the following equation:

$$r = \frac{s}{s_t} = \frac{s}{(\hat{s}/e)f} \qquad (13)$$

where s = number of students in class
s_t = total number of students taught by instructor

- Support Staff

In the reading class allocation submodel, certain types of support staff are allocated to reading classes in proportion to how often the teachers indicate they use these staff. For example, a teacher who indicates that she uses a teacher aide on the average of two hours a week for reading, would be assigned 2.7 percent of the total school reading program use of teacher aides, if the total estimated usage of teacher aides in the reading program was 75 hours per week (2/75 = .027). This technique for determining reading class allocations is called the Class Measure of Use Factor.

While completing the Program Characteristics Questionnaire, teachers were asked to estimate their frequency of use of particular types of support staff. They were asked to indicate whether these

staff were used often, sometimes, rarely, or if they were not available. Interpreting the meaning of these responses is somewhat arbitrary. However, based on discussions with principals and teachers during our site visits, a range of use was developed and is presented in Table 1. Based on these ranges, specific estimates, called measure of use, were made for each response. As can be seen later, the model is sensitive only to the relative magnitudes of these estimates, and not to the absolute values.

The measure of use factor for each class is calculated as the ratio of the estimated use indicated by the teacher divided by the total amount of use for all teachers. Before this calculation can be made, however, two considerations must be examined. First, the use of fixed estimates for all instructors assumes that all instructors teach reading the same amount of time. This is not true, of course, considering the distinction between regular classroom teachers and reading specialists. Second, the total estimate must take into consideration the use of resources by all other teachers in the school who did not complete questionnaires. These considerations are discussed below.

A regular classroom teacher teaches a variety of subjects including reading. Generally, reading is taught for only approximately one hour a day by such a teacher. On the other hand, a reading specialist may spend up to five or more hours a day teaching reading. It is obvious that if both types of instructors claim to use "often" a particular type of support staff, the reading specialist is likely to actually use staff far more than the regular classroom teacher. For purposes of this study, it is assumed that relative use of staff between types of instructors will vary in proportion to their approximate hours of reading instruction. Thus, if both instructors indicate the same use in the questionnaire, a reading specialist will be assumed to actually use staff five times more often than a regular classroom teacher. As an example, suppose that a reading specialist and a regular classroom teacher each indicated that they used aides often. It is then assumed that the reading specialist uses aides a total of 50 hours per month, while the regular classroom teacher will use them only 10 hours per month. This procedure is called "weighted measure of use," and is presented mathematically below.

$$w' = a \cdot w$$

where w' = weighted measure of use
w = measure of use
a = weighting factor

and $a = 1$ for regular classroom teachers
$a = 5$ for reading specialists

The reading specialists may teach several classes, and their use of staff should be spread across these classes. It is assumed that

Table 1

ESTIMATE OF RESOURCE USE

Teacher Response	Range of Use	Measure of Use Factor
Often	1 hr/week to 1 hr/day	10 hrs/month
Sometimes	1 hr/month to 2 hrs/week	5 hrs/month
Rarely	less than 2 hrs/month	1 hr/month

the use of staff by reading specialists is proportional to the number of students in the class. The following corrected measure of use is defined for each class:

$$\hat{w} = (s/s_t) \cdot w' \qquad (15)$$

where w = estimated use in one class
s = number of students in class
s_t = total number of students taught (see Equation 2-10)

For regular classroom teachers, the corrected measure of use is equal to the total estimate use because they do not teach more than one class. Thus:

$$\hat{w} = w' \qquad (16)$$

When estimating the total reading program use of staff, one cannot simply sum all w', since these exclude all teachers who did not complete questionnaires. However, it is reasonable that the average usage indicated by the teachers who did complete the questionnaire is representative of all teachers in the school. Thus, an estimate of total reading program usage can be obtained by determining an average teacher measure of use and multiplying it by the number of teachers in the school. This process is demonstrated below.

First
$$z = \frac{\Sigma w}{x+y} \qquad (17)$$

where z = average teacher use of a resource
x = number of regular classroom teachers completing questionnaires
y = number of reading specialists completing questionnaires

then
$$w_t = z\,(x_t + 5y_t) \qquad (18)$$

where w_t = estimate total reading program use of a resource
x_t = total number of regular classroom teachers in school
y_t = total number of reading specialists in school.

Using Equations 14 through 18, it is possible to calculate the class measure of use factor, as demonstrated below.

$$r = \frac{\hat{w}}{w_t} \tag{19}$$

- Other Staff

For those staff whose use in the classroom is not discussed in the Program Characteristics Questionnaire, it is assumed that their cost is allocated uniformly to all students in either the grades for which they are available, if they are support staff, or for the entire school, if they are basically administrative or clerical personnel. The calculation of the reading class factors for each class is calculated as the ratio of the number of students in a particular class divided by the total number of students who utilize the staff. In equation form, this factor is computed as follows:

$$r = \frac{s}{\hat{s}} \tag{20}$$

where s = number of students in a particular class
$\hat{s}$ = total number of eligible students determined from Resource Questionnaire.

Facilities

Because the use of facilities for reading is assumed to be proportional to the amount of time the class instructor spends in the class for reading, the reading class factor used in the class allocation submodel is identical to that used for the class instructor. Knowing the type of class instructor, either a regular classroom teacher or a reading specialist, the reading class factor can be calculated by either Equation 11 or Equation 13.

Equipment

In the Program Characteristics Questionnaire, each class instructor indicated the frequency with which she used general categories of equipment. Using the measure of use class factor procedure developed in Equation 19, the individual reading class factors can be calculated.

Materials

The use of basal readers and individual reading kits is discussed by each teacher in the Program Characteristics Questionnaire. Therefore, the class factors for these two resources are calculated using the measure of use class factor procedure developed in Equation 19.

The other two resources, library books and other supplies, are not discussed in the questionnaire. Because there is no reason to believe that a particular reading class will use more of these resources than another, these resources are allocated to all classes in the school using the uniform class factor procedure (see Equation 20).

District Centers

Because no information is available to indicate which reading classes make use of the district centers, the costs of the centers are allocated to all classes in the school using the uniform class factor procedure (see Equation 20).

Task Factors

As defined previously, the task factor represents the proportion of the cost of a reading resource that is used to accomplish a particular task within the school. These tasks include instruction, diagnosis of student problems, in-service training for reading staff, and program planning and administration. The estimates of these factors presented in this section are based on discussions with principals and teachers during our site visits. Although the values are somewhat arbitrary, the use of these factors gives additional insight into the relative emphasis schools attach to each reading task. Sensitivity analyses could be performed where the impact of varying these task factors on the final cost estimates could be examined. As before, these factors are presented below by type of resource.

Staff

This section describes the factors used to allocate staff costs to program tasks--instruction, diagnosis, training, and administration. The kinds of staff used in this analysis were originally identified along

functional or task lines. Thus, it is assumed that for a particular kind of staff, the amount of their time spent performing a task will not generally vary significantly between schools.

The task factors, listed in Table 2, represent an estimate of the fraction of the total reading time that each of the 39 types of staff spent performing each of four tasks. The staff training task shown in this table represents the amount of time an individual spends training other staff. It does not include time spent receiving training. The amount of training received is important and an alternative procedure has been developed. From the Resource Questionnaire, an estimate is made of the average number of hours per year that teachers receive in-service training for reading instruction and diagnosis of reading problems. Dividing these hours by the total number of hours a teacher teaches in a year (6 x 180 = 1,080), an estimate is made of the fraction of time teachers spend receiving training. This fraction, b, is added to the training task. Obviously, the sum of these task factors must not exceed one. The procedure for correcting this problem is shown below.

For Instruction, Diagnosis, and Administration Tasks

$$t' = t\ (1-b)$$

For Training Task

$$t' = t\ (1-b) + b$$

where t' = corrected task factor
t = task factor from Table 2
b = fraction of time an average teacher spends receiving training

Facilities

The use of facilities for performing the various reading program tasks depends on the composition of the staff in the school. It is difficult, therefore, to estimate the average use of facilities by program tasks. However, after a review of the average composition of staff in all schools, the following estimates were made of the task factors:

Table 2

STAFF TASK FACTOR

Staff Members	Instruct[illegible] Factor	Diagnosis Factor	Training Factor[1]	Administration Factor
Classroom Teacher	.70	.15	.00	.15
Teacher-Principal	.70	.15	.00	.15
Paraprofessional	.85	.05	.00	.10
Teacher Aide	.80	.05	.00	.15
Tutor	.90	.05	.00	.05
Student Teacher	.75	.05	.00	.20
Volunteer Aides	.90	.00	.00	.10
Computer Proctors	.90	.00	.00	.10
Reading Teacher-Instructional	.65	.15	.05	.15
Reading Teacher-Diagnostic	.15	.65	.05	.15
Reading Teacher-Instructional and Diagnostic	.40	.40	.05	.15
Reading Teacher-Diagnostic and Training	.15	.35	.35	.15
Reading Teacher-Instructional, Diagnostic and Training	.29	.28	.28	.15
Special Education Teacher	.50	.25	.10	.15
Social Studies Teacher	.80	.05	.00	.15
Math Teacher	.80	.05	.00	.15
Science Teacher	.80	.05	.00	.15
Basic Skills Teacher	.70	.15	.00	.15
Other Specialty Teacher	.80	.05	.00	.15
Librarian	.25	.00	.05	.70
Learning Disabilities Teachers	.50	.25	.10	.15
Psychologist	.00	.90	.05	.05
Speech, Hearing, Visual Specialist	.00	.90	.05	.05
Diagnostician	.00	.90	.05	.05
Media Specialist	.00	.00	.60	.40
Consultant	.00	.00	1.00	.00
Doctor	.00	.90	.05	.05
Nurse	.30	.50	.05	.15
Social Counselor	.00	.30	.30	.40
Library Aide	.00	.00	.00	1.00
Non-Instruction Aide	.00	.00	.00	1.00
Clerical Aide	.00	.00	.00	1.00
Secretary	.00	.00	.00	1.00
Superintendent	.00	.00	.10	.90
Director (Assistant, Superintendent, Administrator)	.00	.00	.15	.85
Supervisor	.05	.10	.15	.70
Teacher Consultant	.15	.35	.35	.15
Federal Projects Director	.00	.00	.10	.90
Principal	.05	.10	.10	.75

Note: The training factor includes only the training of others. It does not include the time spent receiving training. The corrections for including this are discussed in text.

Instruction Task Factor	=	.65
Diagnosis Task Factor	=	.10
Training Task Factor	=	.10
Administration Task Factor	=	.15

Equipment

Equipment is generally used for instruction. However, reading machines and computers do provide some capability for diagnosing student problems. This capability usually is available because of the use of curricula in conjunction with these machines. Computers, because of their high speed capability, often actually prepare diagnostic studies of students by examining their mistakes. For this reason, 10 percent of the cost of reading machines and 20 percent of the cost of computers are assigned to the diagnostic task. The balance for each is assigned to the instruction task. For all other types of equipment, the complete cost is assigned to the instruction task.

Material

Because of the curricula embedded within basal readers and individual reading kits, some diagnostic capability is available. For this reason, 10 percent of the cost of basal readers and 20 percent of the cost of individual reading kits are assigned to the diagnostic task. The balance for each is assigned to the instruction task. The cost of library books and other supplies will be assigned completely to the instruction task.

District Centers

The following estimates represent the assumed use of the two types of district centers observed in the study.

Task Factor	Student Related Center	Resource Related Center
Instruction	.40	.40
Diagnosis	.40	.10
Training	.10	.40
Administration	.10	.10

UNIT COSTS

For each of the 94 different kinds of resources identified in the model, a unit cost was calculated based on the data gathered during the site visits. In addition, teacher salaries were defined for various years of experience and educational background to allow the differentiation of these factors in cost. The calculation of all unit costs included both the annual or recurring cost of a resource and a portion of the capital or original cost of a resource amortized over the life of the resource. The unit costs thus calculated represent the effective annual cost to a school to utilize this resource. As discussed before, these costs can either be the actual costs for resources to a particular school or a standard cost representing all schools. When actual costs are used, the resulting program cost estimates are meaningful to local school administrators because this is the cost they are paying for the program. Because of local variations however, this estimate obscures a meaningful comparison between schools. When such comparisons are to be made, standard costs should be used.

The basic methodology for developing the unit cost estimates is presented below as it pertains to (1) staff, (2) equipment, (3) materials, (4) facilities, and (5) district services.

Staff Costs

Since staffing costs are a major portion of cost of any education program, considerable attention was given to this cost category. Unit costs (i.e., annual salary plus fringe benefits) were determined for 39 different staff types, including: classroom teachers, reading teachers, teacher aides, psychologists, nurses, secretaries, and district superintendents.

District salary schedules were the primary data source for deriving staff costs. At the site visits, actual teacher salary schedules were collected for 97 school districts. The schedules were all structured on the basis of teaching experience and educational background. A composite teacher salary schedule was developed from the site visit data as shown in Table 3.

The indirect salary or "fringe" benefits was added to the base salaries to yield the final unit costs for classroom teachers. These indirect costs were estimated as a percent of the base salary. The costs for classroom teachers were estimated from the standardized schedule using the actual experience and education background of the teachers in the sample schools.

Table 3

AVERAGE CLASSROOM TEACHER BASE SALARY SCHEDULE

	No Degree	BA	MA	PhD
Base salary	6,192	7,294	8,110	8,581
Size of annual increment	228	350	391	384
Maximum number of annual increments	10	12	13	13

The salaries and costs for other program staff were computed using the teacher schedule and average experience and degree levels. For instance, the salaries of support teachers such as music, special education, and reading specialists were computed using the classroom teacher salary formula and the average experience and degree levels generally associated with these staff. In cases where general qualification levels were not known with sufficient certainty, the actual salaries paid were compared to the average teacher salary in the sample schools. Thus, an index was obtained between the staff category and the average teacher salary. The index for psychologists, for instance, was estimated to be 1.43 times the average teacher salary. The indices were verified against other national data sources for education profession salary levels.

Equipment

The equipment types for which unit costs are calculated are all instructional in purpose, and most are of the audio-visual type. The costs of 46 types of equipment were estimated.

To estimate the capital unit cost of an equipment item, a number of considerations must be taken into account. First of all, within each type of equipment there are usually numerous brands. From the site visit data, the normal mix of brands for tape recorders, for instance, was examined. Thus a standardized capital cost for each of the equipment types was determined taking into account the proportion of low- and high-priced machines a school normally purhcases. In addition, all purchase prices reported by schools were converted into 1973 dollars to eliminate the effect of inflation on the data. The consumer goods price index for durables was used to do this. The capital unit cost of equipment

was then amortized over the life of the machine at a 7% annual interest rate to give the annualized capital cost. The life of the equipment was estimated to be either 5, 10, or 15 years, depending on the complexity and ruggedness of the machine. To the annualized capital costs of the equipment were added two annually recurring costs to give the total unit cost of these items. These costs are the annual cost for support materials (software), and the annual cost for maintenance.

Materials

The items in this cost category include textbooks (basal readers), library books, reading kits, and instructional supplies. The unit costs of textbooks and library books were estimated on a per book basis, since numbers of volumes of these items are usually readily available in schools. However, the unit cost of instructional supplies was estimated on an average annual cost per student enrolled. This departure was deemed justifiable due to the great number of small cost elements making up this cost item. The magnitude of these costs does not justify the time involved to utilize the resource approach. Lastly, the unit cost of reading kits was estimated on a per student basis--not per student enrolled but the total unit cost of the reading kit divided by the number of students it was designed to serve.

Reading kits were originally kept separate from basal texts, because it was expected that they would have a substantially higher per student cost. However, the results proved the opposite, because the majority of schools purchased these kits as supplementary instructional tools instead of the primary instructional source materials in their curriculum. Due to the vast variety of kits available, data were collected on the number of kits the school had available to it as well as the number of students each kit was designed to serve--hence the approach of computing the unit cost of reading kits per student served.

Facilities

The unit of facility space which was costed was the classroom. The capital cost of construction for school facilities was estimated to be in the range of $29 to $35 per square foot. Using the estimate of 50 years for the life of a school building and an interest rate of 7%, the annualized cost per square foot was estimated. From this data collected at the site visits, the annual maintenance and operating costs were found to be related to total square feet of facility

space. These costs were estimated at $2.00 per square foot. For estimating the capital and annual O&M costs, the size of an average classroom including associated hall and support office space was assumed to be 1,740 square feet.

District Services

Although district services are regarded as a separate cost category, they comprise all the categories discussed previously--staff, equipment, materials, and facilities. Thus, determining the unit cost of district services is a mini-exercise of the methodology already discussed. District services are divided into two primary categories: student centers and resource centers. The first is more staff intensive; the second is more equipment, materials, and facility intensive. Student centers provide instructional services directly to students. These services involve staff time. Resource centers provide instructional services directly to teachers. These services involve equipment and materials. However, there are exceptions where the services of a resource center involve staff time. An example of this is a center providing in-service training or guidance in curriculum development. This type of center becomes a minor third category of district services.

In a sample of the schools participating in the study, the cost of these centers was studied in detail. Not only were the total cost and "per school served" cost computed, but also the ratio of total costs to staff costs. For student centers this ratio averaged 1.50, for resource centers, 1.90. Since staff data for district services were collected from all schools in the sample, total costs were estimated using the computed ratios. Because facility costs turned out to be an important part of the total cost of district services, the ratio of total costs to staff cost for resource and student centers was closer than expected.

SAMPLE MODEL OUTPUTS

To serve as a demonstration of the potential use of this model, sample outputs are presented for two schools. The outputs employ trial data which are not indicative of any particular school. However, they are representative of the type and magnitude of output possible. This output is presented in Tables 4 through 7.

For each school, two output formats are used. Because of the large number of resources considered in the model, the resources have been aggregated into a total of 19 subgroups and 6 major groups. These are shown on each form, and should be self-explanatory. The first format presents an estimate of the total school reading program cost, while the second format presents the reading program costs for individual classes within the school. Each format is described separately below.

The first column of the first format presents the total quantity of a resource available in the school (n). The second column presents the output of the Program Allocation Submodel, which is the total quantity of a resource used in reading (np). The next three columns estimate the cost to a school for each of the reading resources by the various cost categories (npc). The sixth column computes the percentage of the total cost that each subgroup of resources represents. The remaining four columns present the annualized cost of each resource subgroup divided between the different education tasks (nptc).

For each class in the school included in the study, the second format presents the per pupil cost for each subgroup of resources (nprc). Differences in these costs between classes indicate differential use of resources between classes. Combined with the measure of effectiveness, these differences will provide the basis for future cost effectiveness analyses.

It should be remembered that there are two different types of classes used in the study: regular classrooms and classes taught by reading specialists. These differences are identified in the second format. A regular classroom is identified as a Type 1 class, while a reading specialist's class is a Type 4 (see School B). In addition, each class can either be part of the basis reading program, or part of a compensatory reading program. This distinction is also shown.

Table 4

STUDY OF COMPENSATORY READING PROGRAMS
SCHOOL READING PROGRAM COSTS

SCHOOL: A
NUMBER OF STUDENTS: 731

RESOURCE	----QUANTITY---- SCHOOL TOTAL	READING TOTAL	------READING PROGRAM COST-------- CAPITAL INVEST.	OPERAT.	ANNUALIZ COST	% OF TOTAL	------ANNUALIZED COST BY TASK----- INSTRUCT	DIAGNOST	STAFF DEVELOP	ADMIN
CLASSROOM TEACHER	25.00	3.87	.00	41064.40	41064.40	41.8	28649.07	6139.09	137.16	6139.09
READING SPECIALIST	.75	.75	.00	9450.00	9450.00	9.6	6121.98	1412.77	502.48	1412.77
OTHER SPECIAL TEACHER	4.50	1.41	.00	14946.00	14946.00	15.2	7057.15	2223.85	1106.37	4558.62
NON-TEACHING ACADEMIC STAFF	.75	.37	.00	3975.00	3975.00	4.0	.00	3565.55	211.36	198.09
NON-TEACHING NON-ACADEM. STAFF	1.00	.14	.00	562.48	562.48	.6	.00	.00	1.88	560.60
SUPERVISION AND COORD. STAFF	1.00	.14	.00	2591.71	2591.71	2.6	129.15	258.30	266.96	1937.29
STAFF SUBTOTAL	34.00	6.68	.00	72589.59	72589.59	73.9	41957.35	13599.56	2226.21	14806.46
FACILITY SUBTOTAL	27.00	4.02	220500.63	5732.78	22755.42	23.2	14791.03	2275.54	2275.54	3413.31
TAPE RECORDER/RECORDER PLAYERS	11.00	6.00	479.22	154.67	251.31	.3	251.31	.00	.00	.00
TEACHING MACHINES	1.00	.75	140.48	11.02	31.02	.0	27.92	3.10	.00	.00
MOVIE/FILMSTRIP PROJECTORS	5.00	2.50	805.38	173.42	264.61	.3	264.61	.00	.00	.00
SLIDE/OVERHEAD/OPAQUE PROJECT.	6.00	4.00	523.17	52.60	127.09	.1	127.09	.00	.00	.00
EQUIPMENT SUBTOTAL	23.00	13.25	1948.25	391.71	674.03	.7	670.93	3.10	.00	.00
BASAL READERS	600.00	600.00	3024.00	300.00	730.62	.7	657.56	73.06	.00	.00
INDIVIDUAL READING KITS	117.00	117.00	342.81	33.93	82.74	.1	66.19	16.55	.00	.00
LIBRARY BOOKS	750.00	750.00	2812.50	285.00	593.85	.6	593.85	.00	.00	.00
OTHER SUPPLIES AND MATERIALS			.00	743.92	743.92	.8	743.92	.00	.00	.00
MATERIALS SUBTOTAL			6179.31	1362.85	2151.13	2.2	2061.52	89.61	.00	.00
TOTAL COST			228628.19	80076.93	98170.17	100.0	59480.83	15967.81	4501.75	18219.77
COST PER STUDENT			312.76	109.54	134.30		81.37	21.84	6.16	24.92

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Table 5

STUDY OF COMPENSATORY READING PROGRAMS
READING PROGRAM COSTS BY CLASS

SCHOOL: A

AVERAGE COST PER STUDENT
FOR CLASSES WHERE TEACHERS
COMPLETED QUESTIONNAIRES

CLASS:	21	22	23	24	42	43	44	45	61	62	63	64
TYPE:	1	1	1	1	1	1	1	1	1	1	1	1
NUMBER OF STUDENTS:	27	30	32	29	29	27	27	29	30	29	31	30
COMPENSATORY (YES OR NO)	N	N	N	N	N	N	N	N	N	N	N	N
RESOURCE												
CLASS INSTRUCTOR	79.30	33.32	90.04	52.93	76.11	79.33	21.31	31.70	55.65	40.57	71.20	39.22
READING SPECIALIST	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92
OTHER SPECIAL TEACHER	20.85	20.85	20.85	20.85	20.85	20.85	20.85	20.85	20.85	20.85	20.85	20.85
NON-TEACHING ACADEMIC STAFF	13.49	.00	.00	.00	2.51	.00	.00	.00	2.43	25.13	.00	12.14
NON-TEACHING NON-ACADEM. STAFF	.76	.76	.76	.76	.76	.76	.76	.76	.76	.76	.76	.76
SUPERVISION AND COORD. STAFF	3.54	3.54	3.54	3.54	3.54	3.54	3.54	3.54	3.54	3.54	3.54	3.54
STAFF SUBTOTAL	130.86	71.39	128.11	91.00	116.69	117.40	59.38	69.77	96.15	103.77	109.27	89.43
FACILITY SUBTOTAL	33.93	18.85	38.53	32.57	32.57	48.81	14.03	19.50	31.48	24.96	30.47	24.13
TAPE RECORDER/RECORDER PLAYERS	.45	.08	.38	.42	.85	.09	.45	.08	.08	.08	.07	.41
TEACHING MACHINES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOVIE/FILMSTRIP PROJECTORS	.63	.11	.53	.00	.59	.63	.12	.11	.11	.11	.11	.57
SLIDE/OVERHEAD/OPAQUE PROJECT.	.23	.04	.19	.00	.43	.46	.04	.04	.04	.04	.04	.20
EQUIPMENT SUBTOTAL	1.31	.23	1.10	.42	1.87	1.18	.61	.23	.23	.23	.22	1.18
BASAL READERS	1.09	.98	.92	1.01	1.01	1.09	1.09	1.01	.00	.50	.95	.49
INDIVIDUAL READING KITS	.19	.17	.00	.00	.17	.03	.38	.00	.00	.03	.00	.17
LIBRARY BOOKS	.81	.81	.81	.81	.81	.81	.81	.81	.81	.81	.81	.81
OTHER SUPPLIES AND MATERIALS	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
MATERIALS SUBTOTAL	3.10	2.97	2.74	2.83	3.00	2.94	3.29	2.83	1.82	2.35	2.77	2.48
TOTAL COST	169.20	93.44	170.48	126.82	154.13	170.33	77.31	92.33	129.68	131.31	142.73	117.22

Table 6

STUDY OF COMPENSATORY READING PROGRAMS
SCHOOL READING PROGRAM COSTS

SCHOOL: B
NUMBER OF STUDENTS: 504

RESOURCE	----QUANTITY---- SCHOOL TOTAL	READING TOTAL	------READING PROGRAM COST-------- CAPITAL INVEST.	OPERAT.	ANNUALIZ COST	% OF TOTAL	------ANNUALIZED COST BY TASK----- INSTRUCT	DIAGNOST	STAFF DEVELOP	ADMIN
CLASSROOM TEACHER	14.00	1.47	.00	15582.00	15582.00	26.4	10822.98	2319.21	120.60	2319.21
TEACHER AIDE	2.00	2.00	.00	5658.00	5658.00	9.6	4491.37	280.71	43.79	842.13
READING SPECIALIST	1.00	1.00	.00	12600.00	12600.00	21.4	8126.61	1875.37	722.65	1875.37
NON-TEACHING ACADEMIC STAFF	.52	.02	.00	720.00	720.00	1.2	.00	.00	720.00	.00
NON-TEACHING NON-ACADEM. STAFF	2.00	.10	.00	396.38	396.38	.7	.00	.00	3.07	393.31
SUPERVISION AND COORD. STAFF	1.30	.40	.00	6022.17	6022.17	10.2	333.01	720.23	994.97	3973.98
STAFF SUBTOTAL	20.82	4.99	.00	40978.55	40978.55	69.4	23773.97	5195.52	2605.08	9404.00
FACILITY SUBTOTAL	19.00	1.99	109345.95	2842.88	11284.38	19.1	7334.85	1128.44	1128.44	1692.66
TAPE RECORDER/RECORDER PLAYERS	22.00	9.50	800.37	290.41	461.19	.8	461.19	.00	.00	.00
TEACHING MACHINES	4.00	4.00	1090.30	156.49	311.75	.5	280.57	31.17	.00	.00
MOVIE/FILMSTRIP PROJECTORS	6.00	1.50	225.99	112.75	141.00	.2	141.00	.00	.00	.00
SLIDE/OVERHEAD/OPAQUE PROJECT.	8.00	1.75	192.03	27.30	54.65	.1	54.65	.00	.00	.00
TELEVISION/VIDEO TAPE PLAYERS	9.00	6.75	1381.46	207.16	403.88	.7	403.88	.00	.00	.00
EQUIPMENT SUBTOTAL	49.00	23.50	3690.15	794.11	1372.47	2.3	1341.29	31.17	.00	.00
BASAL READERS	2400.00	2400.00	12096.00	1200.00	2922.48	5.0	2630.23	292.25	.00	.00
INDIVIDUAL READING KITS	240.00	240.00	703.20	69.60	169.73	.3	135.78	33.95	.00	.00
LIBRARY BOOKS	1500.00	1500.00	5625.00	570.00	1187.70	2.0	1187.70	.00	.00	.00
OTHER SUPPLIES AND MATERIALS			.00	361.44	361.44	.6	361.44	.00	.00	.00
MATERIALS SUBTOTAL			18424.20	2201.04	4641.35	7.9	4315.15	326.20	.00	.00
RESOURCE RELATED CENTER	736.00	736.00	.00	736.00	736.00	1.2	294.40	73.60	294.40	73.60
DISTRICT CENTERS SUBTOTAL	736.00	736.00	.00	736.00	736.00	1.2	294.40	73.60	294.40	73.60
TOTAL COST			131460.30	47552.58	59012.75	100.0	37059.66	6754.93	4027.92	11170.26
COST PER STUDENT			260.83	94.35	117.09		73.53	13.40	7.99	22.16

Table 7

STUDY OF COMPENSATORY READING PROGRAMS
READING PROGRAM COSTS BY CLASS

SCHOOL: B

AVERAGE COST PER STUDENT
FOR CLASSES WHERE TEACHERS
COMPLETED QUESTIONNAIRES

CLASS:	21	22	23	24	41	42	43	61	62
TYPE:	1	1	1	4	1	1	4	1	1
NUMBER OF STUDENTS:	27	26	29	28	41	39	20	40	38
COMPENSATORY (YES OR NO)	N	N	N	Y	N	N	Y	N	N
RESOURCE									
CLASS INSTRUCTOR	65.11	51.14	45.57	115.88	32.23	11.18	110.41	25.40	42.81
TEACHER AIDE	16.27	.00	15.14	22.88	10.71	1.12	22.88	5.49	5.78
READING SPECIALIST	.00	.00	.00	.00	.00	.00	.00	.00	.00
NON-TEACHING ACADEMIC STAFF	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
NON-TEACHING NON-ACADEM. STAFF	.78	.78	.78	.78	.78	.78	.78	.78	.78
SUPERVISION AND COORD. STAFF	11.37	9.78	9.78	9.78	20.30	10.84	9.78	9.78	9.78
STAFF SUBTOTAL	94.95	63.12	72.69	150.74	65.44	25.38	145.27	42.87	60.57
FACILITY SUBTOTAL	27.86	28.93	19.50	58.92	13.79	4.78	58.91	9.47	24.85
TAPE RECORDER/RECORDER PLAYERS	1.30	.67	.12	1.83	.85	.45	1.83	.08	.92
TEACHING MACHINES	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOVIE/FILMSTRIP PROJECTORS	.25	.26	.04	.72	.16	.03	.72	.03	.36
SLIDE/OVERHEAD/OPAQUE PROJECT.	.12	.02	.02	.33	.01	.01	.33	.01	.17
TELEVISION/VIDEO TAPE PLAYERS	1.68	1.75	1.57	.00	.55	.58	.00	.11	.12
EQUIPMENT SUBTOTAL	3.35	2.70	1.75	2.88	1.57	1.07	2.88	.23	1.57
BASAL READERS	6.40	6.65	5.96	4.50	4.22	4.43	4.50	4.32	4.55
INDIVIDUAL READING KITS	.17	.90	.00	.00	.11	.60	.00	.00	.62
LIBRARY BOOKS	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35
OTHER SUPPLIES AND MATERIALS	.71	.71	.71	.71	.71	.71	.71	.71	.71
MATERIALS SUBTOTAL	9.63	10.61	9.02	7.56	7.39	8.09	7.56	7.38	8.23
RESOURCE RELATED CENTER	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46
DISTRICT CENTERS SUBTOTAL	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46
TOTAL COST	137.25	106.82	104.42	221.56	89.65	40.78	216.08	61.41	96.68